

## REMARKS

Status of the Claims

Claims 1 – 37 are pending. No claims are canceled. No claims have been withdrawn from consideration.

Claim Amendments

New claim 36 is supported by the specification in Figures 1 and 2, and on page 7, lines 4 – 6, which explains, the apparatus and process according to the invention, as described above, can also be used to process tar and/or oils to produce petrols, diesel fuels or other transport fuels, and/or other chemicals. It will be evident the processing of these materials is only possible with an apparatus with horizontal or near horizontal shafts.

Claim 37 combines claims 1, 2, 3, 17 and 36.

Claim Rejections

- I. Claims 1, 4, 9, 11, 13 – 19, 22, 23, 25, 26, and 29 – 31 are rejected in view of 35 U.S.C. §103(a) and US 5,151,159 to Wolfe et al. (hereinafter, “Wolfe”).

Wolfe relates to an apparatus and methods for converting coal into motor useable fuels and metallurgical coke. Wolfe describes a coal pyrolyzer comprising a retort chamber having a pair of interfolded screw conveyors rotatably connected therein to convey coal.

The apparatus according to Wolfe has a pair of interfolded screw conveyers 35, which the Office action assumes to be the same as intermeshing of the present invention, rotating in opposite directions. Wolfe does not mention the thickness of the blades or the form of the housing.

Applicants respectfully submit it was improper for the Office action to assert:

- Wolfe figure 1 shows the blades on each shaft have thickness at least half the distance between the two neighboring blades;
- Wolfe figure 1 shows the two screws fit closely in the housing such that the material undergoing the treatment has to stay between the blades of the screws; and
- Wolfe figure 4 shows a distance of claim 11.

These assertions are improper, because Wolfe does not assert the drawings are to scale and Wolfe is silent as to dimensions. MPEP §2125 states proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale. When the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. See *Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951, 956, 55 USPQ2d 1487, 1491 (Fed. Cir. 2000) (The disclosure gave no indication that the drawings were drawn to scale. “[I]t is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.”).

Also, with the housing according to the figures it cannot be argued that the blades fit closely to the housing to cause material to stay between the blades.

Favorable reconsideration is respectfully requested.

II. Claims 20 and 32 are rejected in view of 35 U.S.C. §103(a), Wolfe, and US 3,471,369 to Cox et al. (hereinafter, “Cox”).

Cox relates to a system for producing char from organic materials. Cox describes an improvement consisting essentially of providing a passage through a bridge wall of a boiler wherein comminuted or attritioned material of a carbonaceous nature can be conveyed and agitated through the passage. The apparatus according to Cox relates to a system with non-intermeshing blades. In fact, it seems that each conveyor has its own housing. To improve the mixing of the material it is suggested to cut out portions of the flight of the screw. This is the opposite of the method according to the present invention.

According to the present invention, it was found that the thickness of the blades of

the screw conveyors is a determining factor for an efficient mixing of the coal in all successive stages in the pyrolyzation process. It was also found that for an efficient mixing it is important to have a close spacing between the screw conveyors and the housing for the screw conveyors. As expressed on page 2, lines 11 – 26 of the application,

The use of a counter rotating intermeshing double extrusion screw in the apparatus for the treatment of a material under pyrolytical conditions provides an efficient and forced transport of the material and the processed product in the housing, which especially for at least partially plastic material results in a good heat transfer from the housing to the material. For this invention an intermeshing double extrusion screw is defined as an extrusion screw of which two approximately parallel screws have blades such that the thickness of a blade is at least half the distance between two neighboring blades, and of which the distance between the shafts of the screws is at most the addition of the height of the blades on both screws.

The use of a counter rotating intermeshing double extrusion screw results in a positive displacement of the material, whereas a single screw transports the material by frictional drag, and many materials having unfavorable frictional properties get severe feeding problems when transported by a single screw. The counter rotating intermeshing double extrusion screw also provides a very efficient mixing of heavy liquids and particle-like material and especially of at least partially plastic material. Preferably the double screw is closely intermeshing.

The Office action refers to column 6, lines 28 – 32 of Cox, which states, “[t]he rotational speed of the conveyor depends on the end results being achieved, and if the char being produced is not fully process [*sic*], the speed of rotation of the conveyors is reduced.” Applicants respectfully submit, however, this teaching regarding the slow speed of rotation only applies to the conveyors according to Cox. The teaching is irrelevant to the present invention, because the Cox conveyors do not provide mixing with intermeshing blades fitting closely in the housing.

Cox is not cited to compensate for the above-mentioned shortcomings of Wolfe. Favorable reconsideration is respectfully requested.

III. Claims 24 are rejected in view of 35 U.S.C. §103(a), Wolfe, and US 6,264,721 to Takeda et al. (hereinafter, “Takeda”).

Takeda relates to a technique for producing reduced iron from iron ore by using a movable hearth furnace. Takeda discusses Japanese Unexamined Patent Publication No. 63-108188, which discloses a process comprising the steps of stacking a layer formed of iron ore and a solid reducing material on a heart rotating horizontally, and heating the iron ore with radiant heat transfer from above to thereby reduce it. The Office action assumes a skilled artisan would have expected the same result if the iron ore with a reducing agent was heated in the retort chamber of Wolfe.

Applicants respectfully submit, however, the retort chamber of Wolfe seems to be the free space between and above the blades of the conveyor and the housing for the conveyors. Since the conveyors used in the present invention fit closely in the housing, any retort chamber provided according to the present invention is not comparable to the retort chamber of Wolfe.

Takeda is not cited to compensate for the above-mentioned shortcomings of Wolfe. Favorable reconsideration is respectfully requested.

IV. Claims 1, 2, 3, 9, 11, 12, 13, 16, 21, 28, 33, 34, and 35 are rejected in view of 35 U.S.C. §103(a) and US 1,415,061 to Smith et al. (hereinafter, "Smith").

Smith describes a furnace-retort designed for effecting a partial distillation or partial carbonization of coal to eliminate a part of the volatile hydrocarbon content in the coal and to obtain a uniform but partially distilled coal residue. The furnace-retort according to Smith is constructed to have a vertically extending tubular shell. Coal is fed into the upper portion of the retort shell, and discharged from the lower portion. Smith describes two shafts each having outwardly extending members to ensure the downward passage of the coal through the shell. According to column 1, line 51 – column 2, line 1 of Smith, the shafts each have a body portion with a relatively large diameter and hollow to provide the large diameter without unduly increasing the weight of the shaft.

Applicants respectfully submit it was improper for the Office action to assert:

- Smith figure 1 shows the blades on each shaft have thickness that are at least half the distance between the two neighboring blades;

- Smith figure 1 shows the two screws fit closely in the housing such that the material undergoing the treatment has to stay between the blades of the screws; and
- Smith figure 4 shows a distance of claim 11.

These assertions are improper, because like Wolfe, Smith does not assert the drawings are to scale and is silent as to dimensions. Again, MPEP §2125 states proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale.

Moreover, Smith discloses a set of conveyors with a lot of space between the blades, which is the opposite of what the Office action is deriving from Smith's figures.

The vertical position of the axis of the Smith conveyors will not contribute to good mixing of coal. Applicants respectfully submit new claims 36 and 37 further distinguish over Smith, by reciting the counter rotating intermeshing double extrusion screw to be orientated substantially horizontally. Thus, substantially horizontal shafts are used in the apparatus for performing the methods of present claims 36 and 37. The present description mentions the present apparatus is also suitable for use with oils. As will be evident, whatever the oil viscosity, the mixing with oils according to the present method would employ an apparatus with horizontal or near horizontal shafts.

V. Claims 5, 6, 7, 8, 10, and 27 are rejected in view of 35 U.S.C §103(a), Smith, and US 3,178,361 to Bailey (hereinafter, "Bailey").

Bailey relates to an apparatus for carbonizing coal into char or coke in a continuous feed operation, while recovering volatiles and distillates. The Bailey apparatus utilizes as a continuous feed mechanism a pair of forwardly driving self-cleaning intermeshing screws plus a feedback screw operating in the reverse direction. According to column 1, lines 54 – 56, the intermeshing screws are hollow and communicate with a heating gas inlet header and a gas outlet header.

As discussed above, Smith does not show screws having blades such that the thickness of a blade is at least half the distance between two neighboring blades, and Smith does not show two screws that fit closely in the housing such that the material

undergoing the treatment has to stay between the blades of the screws. Bailey is not cited to compensate and does not compensate for this shortcoming.

The Office action cites column 2, lines 15 – 22 of Bailey, which states, in the case of certain high volatile coals, it is desirable to feed back a greater proportion of the advancing material, e.g., even as much as 50 percent over and above the swelling factor. Accordingly the screws 10 and 20 are shown in the drawings as having a uniformly decreasing pitch from right to left, so that the pitch at the discharge end of the retort is about one-half the pitch at the coal-entering end. Based on this citation, the Office action suggests a skilled artisan would have used a Bailey blade having an alternating pitch on a Smith shaft.

However, Bailey does not describe screws having blades such that the thickness of a blade is at least half the distance between two neighboring blades, and does not describe two screws that fit closely in the housing such that the material undergoing the treatment has to stay between the blades of the screws. The blades on the Bailey shafts are relatively thin and the mixing provided is not comparable to the mixing provided according to the present invention and Bailey does not provide a reason to make a modification leading toward the present invention.

#### Fee Authorization

Please charge any shortage in fees due in connection with the filing of this paper, including any shortage in Extension of Time fees, to Deposit Account 14.1437. Please credit any excess fees to such account.

Conclusion

The present application is in condition for allowance, and applicants respectfully request favorable action. In order to facilitate the resolution of any questions, the Examiner is welcome to contact the undersigned by phone.

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